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ABSTRACT

Discussed in this paper is how a multi-faceted research strategy was used to investigate the interacting forces existing in open classrooms. Using behavioral mapping, a standardized naturalistic time-sampling technique for quantifying and describing behavior patterns and use of physical space, day long observations of individual children and interviews with children and teachers, data were collected which enabled analysis of classroom environments from a number of perspectives. (Author)

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N ECOLOGICAL APPROACH TO THE STUDY OF OPEN CLASSROOMS

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Classrooms within schools are often described as small societies, and nowhere is this so clear as in the open education setting. The open classroom is an educational philosophy in which spatial components are a central aspect and in which the total system is made up of many separate interacting forces. Although there are varied interpretations of this educational mode, the options given to children lead to classroom movement and activity and make what transpires, the traffic, use of services and communication much like the flow of persons and services in a small community.

For an environmental psychologist, the open classroom system is an intriguing one to understand. Since the environment is an integral component, there is an opportunity to consider its place in the complex system. How do we begin? Clearly, we need an intimate picture of what is taking place, particularly from the child's view. We need to see what is going on in the context of a very detailed picture of the setting. We must keep in view the teachers, their role, goals and movement patterns, as well as those of the children. And it is also essential to tap the program set forth by administration, and the goals held by parents.

The multi-faceted research strategy that was selected to reach these ends began with the conviction that it was essential to know specific classes very well. We entered a number of real classrooms and tried to understand their functioning from as many perspectives as possible. Basic to this understanding was the recognition of the inseparability of the physical elements from their social meaning.

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In considering each room we observed all the occupants to gain a sense of general use. We observed randomly selected persons to gain a sense of individual use. We used interviews with children and teachers as well as with parents and administrators. We have used group workshops and individual feedback sessions with teachers to explore what is happening within the classroom. We also have tried to understand what the community is like. Over time we have accumulated a complete log of events, impressions and comments. We have looked at the physical arrangements within each classroom and have traced changes over time. Each method brought us to the classroom again and again, each time with a slightly different function, a different research tool, enabling the construction, layer by layer, of a complete and intimate view of each classroom. The combination of familiarity with each class and much systematic information about them contributed to an understanding enriched beyond any one single measure. In a sense it is these interlocking systems which combine to form what is for us the ecology of the classroom.

Study Sites and Methods

The study took place in two publicly administered schools, part of the same municipal school system in a large urban area. Both of the schools have rather similar designs, and occupy buildings that date back to the turn of the century. They accommodate children of varied backgrounds. These schools were chosen because both were using open education methods, that is, a program using children's interests and a flexible use of learning materials and space. In addition, both expressed a willingness to cooperate with our work and an interest in learning more about the role of the environment in open education.

Although data were gathered for four classes in each school, this paper will concentrate on one class in an attempt to reconstruct from the varied information an holistic view of the room.

The major observational technique used was that of behavioral mapping, a standardized, naturalistic time-sample technique for quantifying and describing behavior patterns and use of physical space. For each school, a detailed floor plan was made of the study sites, primarily classrooms, but also corridor spaces and ancillary rooms. Each classroom floor plan was divided into twelve sectors. Since classrooms were physically similar in terms of location of windows, corners, wardrobes, and in most cases doors, comparisons of similar portions of rooms were facilitated by use of the grid.

Observers moved through each room in a prescribed sequence, recording each activity, the number and nature of participants (teachers, visitors, children), the specific room location by sector and the materials used. Classroom observations were made every thirty minutes for four consecutive days at three times, October, January and May, during the school year.

These data have been analyzed for each classroom in terms of activities observed, size of group, the location of children and teachers and materials used. The number of participants in each room sector provided a measure of density within parts of the room. The behavioral profiles of each room were examined against the floor plans detailing furniture placement for each mapping period. This enabled consideration of the interaction between the setting and the users, the children and teachers. In addition to the room plans used during mapping periods, detailed pictures of the physical arrangements within each classroom were recorded

on a bi-weekly schedule. This procedure enabled assessment of the extent to which these potentially flexible settings changed over time.

In order to understand the relationships between the process of working within the open classroom and the supports or obstacles offered by the setting, observations of randomly selected boys and girls, were undertaken. Three sets of observations were made for each child, following them from their entry in the morning until dismissal. The observer made a continuous record of the child's behavior including the sectors of the room where the child was located, participants, furniture involved, posture, amount of conversation, materials, location of teacher, and the initiator, terminator and duration of each activity.

Interviews with children, parents, teachers and principals explored their expectations and attitudes with regard to the school program and its use of space. Our particular concern with children's perceptions and use of their classrooms led to the development of an interview technique incorporating models of classrooms. Using a scaled model of their room, children arranged two representations, the first of their actual room and the second of their ideal. After each representation, children were asked to explain the way they used, or would use each modeled classroom.

Classroom, School B

The classroom that we will examine in detail is part of School B which is located in a residential neighborhood, with small, single family homes and some apartment buildings along tree-lined streets. Although the surrounding area is largely middle class, the school population is drawn from a larger feeder area, and many children are transported by bus. The original building constructed in 1908, has three floors, with

an attached annex completed in 1954. The classes selected for the present study were all located in a single floor of the annex. Three of these were second grade classes, containing children who were approximately seven years of age. The fourth was a first grade class, with six year old children. There were about 30 children in each room.

The classrooms were essentially self-contained, although there were opportunities to go to a music room and gym once a week. In addition, corridor areas adjacent to the rooms were available for use. Teachers were free to set up their rooms as they wished, and in general an informal arrangement was used. Standard furnishings, tables, chairs, and desks were available and these were supplemented with rugs, bookcases, room dividers and cubbies for children's belongings. Some of this was teacher-constructed out of tri-wall (heavy cardboard) or wood.

The rectangular rooms were similar in size and physical details. They were approximately 875 square feet. Each room had a single entry with a blackboard along the wall adjacent to the door. There was a wardrobe along the corridor wall and windows on the opposite side. The short wall opposite the blackboard contained built-in cabinets. Each room had a sink, but lavatories were located outside the rooms.

Classroom B in School B (see Figure 1) had an arrangement, for

[Insert Figure 1 About Here]

most of the year, that divided the room into four parts, a library and loft reading area, a section with a large single surface table (4' x 8') near the teacher's desk, a science/math/cooking area, and a section in the rear that had a variety of surfaces (paint table, planter and desks). In the course of the year, the areas essentially retained their integrity, changes appearing in placement of desks, small tables and low bookcases. The large 4' x 8' table pivoted in its area. The major change in this

room was the addition of a free-standing loft in early October. This structure had two levels, and was eight feet high, four feet wide and eight feet long. It adjoined the library area and served to divide it from the other parts of the room. The loft's arrival caused considerable excitement, attributable in large measure to the fact that the children were unaware that it was expected and also to the novelty of the piece. Figure I presents a picture of the room with the loft in place.

Materials and books were prominently displayed providing easy access. The cubbies stretched along the front, under the blackboard and gave each child a drawer for personal belongings.

The relatively unchanging picture of the furnishings found for this room mirrors the general finding for all classes. Most rooms remained intact with movement generally occurring to small pieces.

General Results

Perhaps the best way to enter the class is to consider the activities in which teacher and children were engaged against general findings for all observed classrooms in the school. The predominant activities for the school in each of the three mapping periods are presented in Table I.

[Insert Table I About Here]

Writing was consistently most frequently observed over the year accounting for at least one-fifth of the activities included. Arts and crafts, talking, working with materials and reading continued to appear among the commonly observed activities although the actual rankings changed over time. The category of working with materials refers to the use of predominantly science or math materials, such as a balance beam or counting beans. For this school, three activities generally constituted 47% or more of all observed behavior.

The same predominant activities appeared within the classrooms we are considering although their relative ranking reflects greater stability than for the school as a whole (see Table II). Writing,

[Insert Table II About Here]

talking, reading and arts and crafts are the only activities occupying the first four ranks for each mapping. For this class, as in the school, the first three ranks account for at least 47% of the total activity.

With the knowledge of the nature of activities in the room let us consider the patterns of use of available space. Table III presents a

[Insert Table III About Here]

picture of the distribution of people in activities across the 12 sectors of the room, at three points in the school year. The data reveal areas of greater and lesser concentration. The mappings indicated an uneven use of the room, a finding that was characteristic of other classes studied, as well. The arrangement of furniture and equipment, the location of the teacher and the focus of general group meeting space could explain much of this concentrated use, although we will pick up a series of other factors operating, as well.

In this particular classroom, the area where most group meetings were held, sectors 3 and 4, served as a place for reading, a kind of library, for the rest of the day. This corner sector was bounded by the loft, the window wall with bookcases below, the corner wall with blackboard and cubbies below, and an open access to other parts of the room. Three small pieces of rug were on the floor. This segment of the room remained consistently high in use, with 33-43% of the total occupants observed in this area. It is interesting that for each of the mappings other areas

of heavy density were adjacent to this reading area. The disproportionate use of space is apparent when we look at areas 3, 4, 7, 8, 11 and 12, that is, the part of the room identified by occupants as the front. The density in the front ranges from 73 to 85% of the total occupants for the three mappings. It is important to keep this picture of density in mind as we trace other patterns of use in the room.

The general ranking of size of group involved in classroom activities remained constant over the three mappings as seen in Table IV. Single

[Insert Table IV About Here]

person behavior was predominant, increasing from 67 to 74% of all activity over the year. Groups of three persons declined from 11% to 7% from the first to last mapping. We might recall that the predominant activities in the class were writing, reading and talking. Writing and reading together, constituting 34 to 40% of the total activity, support the predominant individual mode revealed in group size comparisons.

In surveying the different classes, the teacher's activities, location and style of working were important aspects of the total ongoing activity and the spaces used. Looking at the activities for this teacher, as reported in Table V, there was a narrowing of scope and concentration

[Insert Table V About Here]

over the year. This was reflected in both the range of activities in which the teacher was involved as well as the proportion of time spent in prime activities. The teacher was observed in 17 different activities in the first mapping, 10 at midyear and 6 at the end of the school year. Most striking was the complete elimination of specific activities as

the year passed, among these arts and crafts, audio-visual activity, food preparation, story-time and watching activities, a rather broad array. In effect the teacher introduced the class to a variety of activities which the children continued to pursue independently over the year as she concentrated on a few curriculum-related tasks.

Talking, teaching and checking work were the three predominant teacher activities over the year, each occupying from about 12 to 45% of the teacher's time. Additional activities occupying over 10% of the teacher's time were group meetings in the first and third mapping and administrative activities in the third mapping. Within this picture, it is notable that talking, which was in first place at the beginning (20% of the total), dropped to 11.8% in midyear and 13.8% at the end. Indicative of the strong focus of the teacher's time was the increase in checking work. This began in third place with 12.5% of the activity rising to first place in the second and third mappings reaching 38.2% and 44.8% of the total activity.

How is this increasing focus on specific activities reflected in the teacher's location within the room? Although the first mapping found the teacher in some sectors a major portion of her time, in fact, she was observed in every area at least once. Table VI presents

[Insert Table VI About Here]

these data. Fifth-six percent of her time was spent in the sectors adjacent to her desk, that is, areas 2, 3, 6 and 7. The second and third mappings indicated a more limited number of teacher locations paralleling the limited range of activities with which she was involved. Each successive mapping found her in one predominant sector at least

32% of her time. In each instance the major teacher activity within these heavily used areas was that of checking work, the first ranked teacher activity for these two mapping periods.

Considering the size of the group from the observed behaviors of the teacher we find first, that the two person group (teacher and student) was the most frequently observed mode (see Table VII). Within this

[Insert Table VII About Here]

finding, the three mappings revealed somewhat different pictures. At the beginning and end of the term the teacher was seen alone at least 20.7% of her time dropping to 5.9% midyear. Larger groups of 15 or more, which generally included the entire class, increased from 15% to 26.5% or more by the second mapping. The three to seven person group was seen one-fifth of the time in the first mapping, dropping sharply the remaining observations. This mode mainly included talking and teaching. What is evident in the early mapping is a more even distribution of group types, paralleled by our findings of a wider physical range and set of activities evidenced by this teacher.

Noteworthy, at this point in view of these changing patterns, is recognition of changes in the number of student teachers (students in training) available to assist the teacher. During the second mapping there were no student teachers in the classroom and fewer present in the third mapping than the first. The student teacher's presence in the class appeared to have dramatic effects on the way the teacher used her time. All aspects of her style were affected, the location, group size and nature of activities in which she was involved. The second mapping revealed only 5.9% of the teacher's time spent alone, and 55.9% in

individual contacts (mainly checking work). Large group activities also increased for both second and third mappings.

The teacher's interview specified a series of parallel goals for children. Basically, she wanted them to learn how to learn and how to share and get along with others in the room. Her priorities were directed toward motivating children to carry out plans initiated by both the teacher and themselves. The teacher felt that the physical setting played an important part in meeting those goals. She was concerned with making materials accessible and providing a variety of spaces to meet children's different work styles. She was quite pleased with the room and interested in strengthening and improving its quality. She was anxious to encourage more independent work and projects. She felt that children needed more space, that 32 children were just too many.

Informal contacts with this teacher during visits to her classroom and participation in environmental workshops revealed a determined effort on her part to keep closely in touch with what the children were doing, at the same time encouraging the children toward independent work. In the course of a day with 30 or more children, these were somewhat conflicting goals. The desire to keep watch on individual progress tended to keep children in close proximity to her. There often was a long line of children waiting to have work checked. These facts help to explain the density in the front of the room. Her discomfort with children being out of view was mirrored in her comment one day that children who could be trusted could go to the back of the room. There was a spatial conflict in this strong effort, for the open classroom with its informal arrangements and visual barriers often precludes easy view of everyone.

Where visual access is important, as in this class, the strategy to keep everyone in sight could readily lead to the convergence of children. In workshop sessions with this teacher, when environmental problems were discussed in light of objective findings, she was able to recognize that surveillance of the children and accessibility to them had undesirable by-products. The density led to difficulties especially for distractible children. A major problem came from the rather high noise level in specific zones which resulted from the concentration of children in one area, the competition to be heard, children getting in each other's way, and resultant intervention by the teacher. At the very least, this was disruptive and limited the availability of work space and privacy. Yet working toward ameliorating the problem involved more than providing alternate seating areas; they were, in fact, already available. Rather, a re-evaluation of her priorities was needed, and a consideration of alternate ways of reaching her goals.

Following three complete five-hour days for individual children enables an understanding of the way the room functions from another perspective. We will look at two members of this class. When Sue was first observed in early November, there were three class meetings, rather brief, coming at the beginning of morning and afternoon and ending the day with a puppet show. In times that were not structured by the teacher this child was able to select the time and place of prescribed curricular tasks, as well as activities of her own choosing. Reading, writing and math activities occupied approximately three hours of the total day. This individual work was generally pursued near others accompanied by casual intermittent conversation, although one

reading task involved 24 minutes of deep concentration.

Sue's second and third day had more time devoted to group and teacher initiated activity, including group meetings, lessons and class work periods. There was less time for self-initiated activities, although Sue did find time to go to the workbench in the hall, read alone, view a film strip and work with math cards and games.

On all days, Sue spent the time free from group lessons on work done in the casual association of peers. Each day, however, Sue spent a period of time working alone with deep concentration. Sue worked in the commonly used areas of the room, that is, the library area and around the large table. There was an indication of a wider range on the final observations.

This child's contacts with the teacher increased over the year, primarily those initiated by the teacher. Sue initiated brief contacts divided among asking for permission, information and having work checked. The teacher-initiated contacts were generally direction-giving and prodding.

In our interview with Sue using the model, she was able to describe the reading area in a way paralleling her use. It was viewed as her favorite place, where she read, worked and met friends. She accurately depicted this area as the busiest part of the room. She also recognized one of the sparsely used areas to be the quietest place and a place to be private but an area she used only rarely.

In her general interview Sue had definite ideas of what her parents and teachers expected of her in school, to work hard, learn and be nice. She had favorite school activities, especially putting on plays and doing

math. Her suggestions for improving the room included more space for play productions and the need to separate painting and math areas. The interviews and observations combine to reveal a purposeful and aware environmental style of an interested child who was able to maintain concentration in busy areas filled with diversified activities. Sue was a self-possessed and moderately reserved 7-year old--able to share activities and enthusiasms with others, but equally able to sustain solitary and parallel activities. On the first day of observations, a loose tooth was a recurrent theme for Sue--she wiggled it, shared the progress of its removal with peers, visited the bathroom to wash it, and finally triumphantly announced its departure. Yet, despite this she followed through on a series of tasks and was, in fact, able to concentrate. Her use of the room seemed appropriate to her work; the locations she selected were popular and busy ones yet she was able to pursue her work effectively with a minimum of distractions.

A boy in this class, Bill, presented a very different picture. On all three days of observation, the class went to the library for almost an hour in the morning. On day 1, there was a wide range of things going on with a minimum of structured lessons. Three brief group meetings constituted the most organized portions of the day. The second and third days had more structure, including educational television, a class play and a math lesson.

On the days observed, Bill revealed very little real involvement in what he was doing. It appeared difficult for him to get into tasks--his eyes wandering over the room, barely working yet filling the time with superficially appropriate stances. He spent much time waiting on line to have his work checked or to ask a question. He moved about

considerably, for drinks, to go to the bathroom and repeated trips to and from his cubby. The teacher and the student teacher kept their eyes on him prodding him along, encouraging him to work. At one point, they interrupted his attempts at reading in order to check his math homework. His use of the room closely approximated the class pattern. Most of his time was spent in the front portions.

The observer noted that when he went up to the top of the loft he was very distracted by the other boy there, the loft itself, the view of the class below, the teacher's voice, a class passing the door of the room and noises in the hall. He spent most of the time engaged in looking about. This distractibility persisted over our observations. The few tasks he completed took an exceedingly long period of time with many interruptions and questions. The few times Bill used the more secluded area under the loft or the rear of the room, he seemed to work more effectively.

From our view Bill seemed to be a child who needed help with planning his day, including appropriate places to work. He was not really disruptive nor disturbing to the teacher or the class. His contacts with the teacher, both self-initiated and those directed by her, reduced from 32 in the first mapping to 16 and then 12 in the final mapping. Checking work almost disappeared by the end of the term, while teacher prods were there but lower.

Bill's interview reflected his days, he really had no preferred activities but rather described things expected of him. He recognized that the rear of the room afforded privacy, quiet and a place to get

away from others. His model was an adequate representation of the real room although the front portion was better articulated than the back.

A moment in time can demonstrate how the data discussed, activities, space utilization patterns, sequence of activities, interaction modes, initiators and terminators of activity yielded by the various methods can lead to enriched understanding of the total system. Let us re-enter the setting at 10:30 on the morning of May 23, 1974, view the ongoing scene and interpret what is happening in light of our aggregated data (see Figure II).

[Insert Figure II About Here]

The distinctive pattern of disproportionate room use is immediately apparent. Of the 26 persons observed, 20 are located in the front half of the room. The children can be seen in the reading area, at the large table and near the teacher's desk. In the library, sectors 3 and 4, three individual children are reading. A girl is lying on top of the loft, a girl sunk deeply into a bean bag chair, both engrossed in fiction books. A boy sitting crosslegged on a rug is concentrating on a textbook. A girl is watching an activity, a boy is looking at a doll on the radiator, and a girl is looking at a notebook in her cubby. A boy is kneeling working with materials and a book. At the large table near the blackboard in sectors 8 and 12, writing is taking place with an overlay of talking. For two girls the predominant activity is talking, while two girls and two boys are preoccupied with individual writing activities. We suspect from the results of our longitudinal data that at least some of the children engaged in individual tasks do, in fact, have a sense of themselves as being with others. That is, an extension of this moment in time might find another dyad talking, or one of the children writing

might glance up, ask something of another, then both return to their focused work.

In area 7 the teacher is at her desk checking a boy's work with him, an activity that is an important part of this teacher's style. Two boys and three girls are on line waiting for the teacher, another frequently observed activity. In the back of the room most of activity is in the math area in sector 10. Here four children are working independently, two boys using commercial reading kits, two girls using math materials. Three of the room sectors are vacant and two children are observed walking in separate areas.

This record represents a frozen moment of time, a view of a classroom generally in flux. A moment earlier or later might show a slightly different configuration. In fact, if we move a bit forward in time to the next mapping period we see two children talking in the library and three talking in the math area, locations which previously contained only individual activity. We would also see painting in area 9 where previously we saw an isolated child walking.

Discussion

We have attempted to construct an ecological view of a classroom by presenting a network of information about that setting. No single set of data provides the total view. Rather, each separate facet of our study tends to shed a bit of light on the complex socio-spatial system.

When one considers what a traditional classroom is like, children in ordered seating arrangements, stationary much of the time at their desks with few educational materials displayed, a marked contrast is offered by the room we have introduced. In the room we have described there is an order, but it is neither spatially nor behaviorally apparent, on

first view. Rather, a quick look reveals an almost random agglomeration of people, sounds, objects and furnishings. There are people - 30 or more - some alone, some in clusters, some working silently, others communicating, all in an informal arrangement of space. The open shelves and work surfaces display an abundant supply of materials, books, papers, games, rods, coins, chips, balance scales, paints, cooking supplies, a planter and aquarium. The varied sights are accompanied by smells, sounds and tactile stimuli. When one tries to consider what it is like to spend a day in this room, to work, rest, socialize, all the time acquiring some sense of oneself, the experience contrasts sharply with the explicit order of more traditional settings. The abundance of stimulation on many levels requires a system for sorting and ordering. It presents each person, child and teacher, with a continuing challenge to their cognitive, social and environmental competence.

This multi-modal stimulation in the classroom is produced by the combined effects of varied objects, people, sounds, smells and movement. This can be the source of intense excitement, but it may also generate problems. Boundaries are not always apparent, and in addition, are constantly being redefined. With every new person joining a group, with every new activity, new boundaries emerge. In many cases, the traditional separation between inside and outside, room and corridor is not strong. In the class we have studied, this problem of multi-modal stimulation was compounded by the uneven use of space. The very convergence rational for some of the teacher's concerns increased the stimulation in the room. Although many children were able to work close to others, for some individuals this added to the distractions. The

nature of the work was also a factor in evaluating the effects of noise. As Brunetti (1974) has indicated, a particular noise level may not be disruptive in a laboratory, but could interfere when a more passive but deeper concentration is required.

Contacts become another critical component of the classroom system and the level of stimulation. The teacher we have described had a style that clearly involved keeping on top of the activities of students, despite the variety of tasks and places. Recalling her interactions with the two children studied, she had an average of 11 contacts a day for Sue, 20 for Bill. Although these were not general averages, our experiences suggest that they were fairly representative. These contacts tended to flow, often taking up a brief moment, sometimes looking like simultaneous time-sharing. The 40 to 50% of her day in which she was observed interacting with an individual child accumulated an enormous number of individual contacts. Although these contacts enabled the teacher to keep in close touch with all the children, an important goal for her, it provided obstacles to others. The children's reliance on immediate feedback led to inordinate demands on her time. Frequent interruptions of the teacher when she was involved with individuals or small groups led to frustrations for all. Children developed strategies of vying for attention. And the teacher felt that she could not get to the art work and projects she desired because there were too many children in the class.

Our multi-methods served to assist understanding children's contacts as well as those of the teacher. Behavioral mapping revealed individual activity, that is, children working alone to be the predominant mode. Longitudinal observations which concentrated on a flowing, in-depth study of behavior revealed more associative or parallel than solitary

modes. What emerged was the sporadic social overlay on many individual tasks. Although the child might be completing teacher or self-directed assignments, there was clearly the freedom to be near peers, to socialize, ask for help, or give assistance. Following individual children dramatized the parallel qualities of the day - working and being with others. Yet, there was a persistent "on stage" quality to these days for teachers and children. Interviews pointed to the fact that many of the children recognized areas in the room that could provide quiet, privacy and a temporary separation from the social network. As previously mentioned, however, there were limits on the freedom to use these places.

Children differed in their use of the room and their individual styles. What was a choice for one was a problem to another; what was stimulation for one was disturbance to another; what was a boundary for one was a blur or a formidable obstacle for another. The reality perceived by each was built upon the interaction between their individual skills and self-direction and environmental supports and constraints.

Sue's day was a blend of required and elective activities amid a context of friendly relations and teacher approval. In contrast, Bill was frequently diverted from tasks by the multitude of activity in the room and since he barely met classroom requirements, he had few options. In fact, the potential opportunities, both social and academic in this room were more available for Sue.

Individual styles reveal a wide range in the functional skills helpful to the open classroom process. The opportunity to choose the time and place for work requires an ability to plan. It presumes the capability to anticipate the length of a task and the available time. It requires a review of appropriate areas in order to synchronize time and space

into the overall schedule.

A frequent question raised with regard to open classrooms concerns children who have not developed the capability to plan. One suggestion has been to screen children for traditional or open environments based on a variety of personality dimensions (Solomon, 1974). Another approach might be to consider that the skills required for an open classroom are necessary for a variety of life settings, therefore, important ones to develop in children. It is possible that a child such as Bill can be helped to evaluate his needs against the spatial opportunities within the room. By looking at a variety of individual styles, rooms can be planned to accomodate this range. This direction was one rationale for our workshops and individual feedback sessions with the teachers.

The workshops presume that change can be planned through a rational process of understanding the total classroom system. We had initially anticipated that the classrooms studied, each different, each containing a varied array of loose parts, furniture, objects and people, would change over time. In the end, we found few extensive changes and little evidence that rooms were altered to meet short-term goals. Perhaps this is not surprising in view of the stability in activities and patterns of use.

As we stand apart from the room for the moment and reflect on our observations, both systematic and informal, only two major changes seemed to occur during the year. The first was the loft planned by the teacher to enable the children to have additional space and a place for some privacy from general circulation. For the children who were not aware of the teacher's plan, the loft represented an array of imaginative possibilities including a playhouse, a boxing ring and a place for art work. The ensuing congestion of climbing, exploring children resulted

in an immediate prohibition of its use and then the establishment of rules for its use. Over time the class developed a shared image or the meaning of the loft and teacher intervention was less necessary.

A series of changes were set in motion when student teachers left at the end of their college semester. The activities and locations of the teacher became more focused and she spent less time alone and more with students, in dyads and with total class groups. This obviously also affected children's use of time. Children's locations converged also, as evidenced by 10% less use of the back half of the room, a sector previously used both with a student teacher and by themselves. Thus, the response to an external factor - in this case, absence of teacher aides, further heightened the pressures teachers feel when they have no classroom assistance.

Thus, the process of change was complex. The external factor, the elimination of teacher aides, in turn altered the teacher's use of her time, setting limits on what the children could do and areas they could use. We are reminded of a very different setting, a children's psychiatric hospital, where underuse and understaffing led to programmatic changes (Rivlin & Wolfe, 1972). In both cases, had the setting been considered in terms of its potential, in the case of the classroom, providing a more even distribution of materials and resources, the original change might not have been so disruptive.

As we consider these specific changes, one planned, one circumstantial, the inseparability of the physical and social room components become clear. Trying to understand how a portion of a room is used cannot be achieved by focusing on physical arrangements alone. For example, how could one expect, viewing this room, that desks in the back of the room would be used infrequently. There was little in their physical form or arrangement that would explain this. What is apparent is that the working

surfaces became imbued with meaning according to their location and the social organization of the room.

In effect what is shown is that rather than a simple, casual relationship between room arrangement and patterns of use there is a more complex understructure. To unravel this, it is necessary to start with a teacher's partly articulated, partly intuitive arrangement of space. This initial arrangement provides a structure for the program whose development crystallizes the meanings of room sections. As the process further defines both the social and physical meanings, total images of the room are formed for the users. These images, the sum of social, symbolic and functional meanings define the ecology of the classroom for its occupants.

Note

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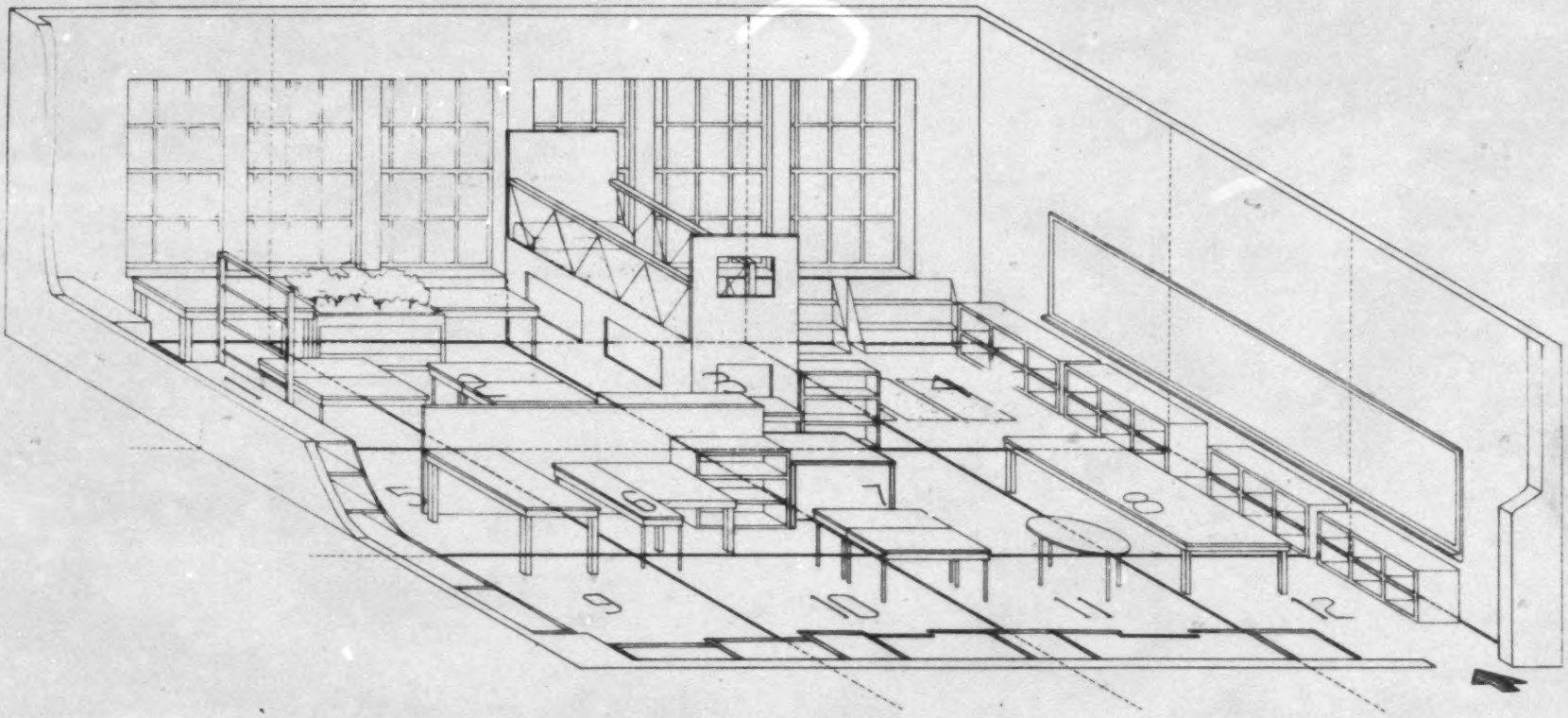

Figure I: Isometric view of Classroom B with 12 part grid

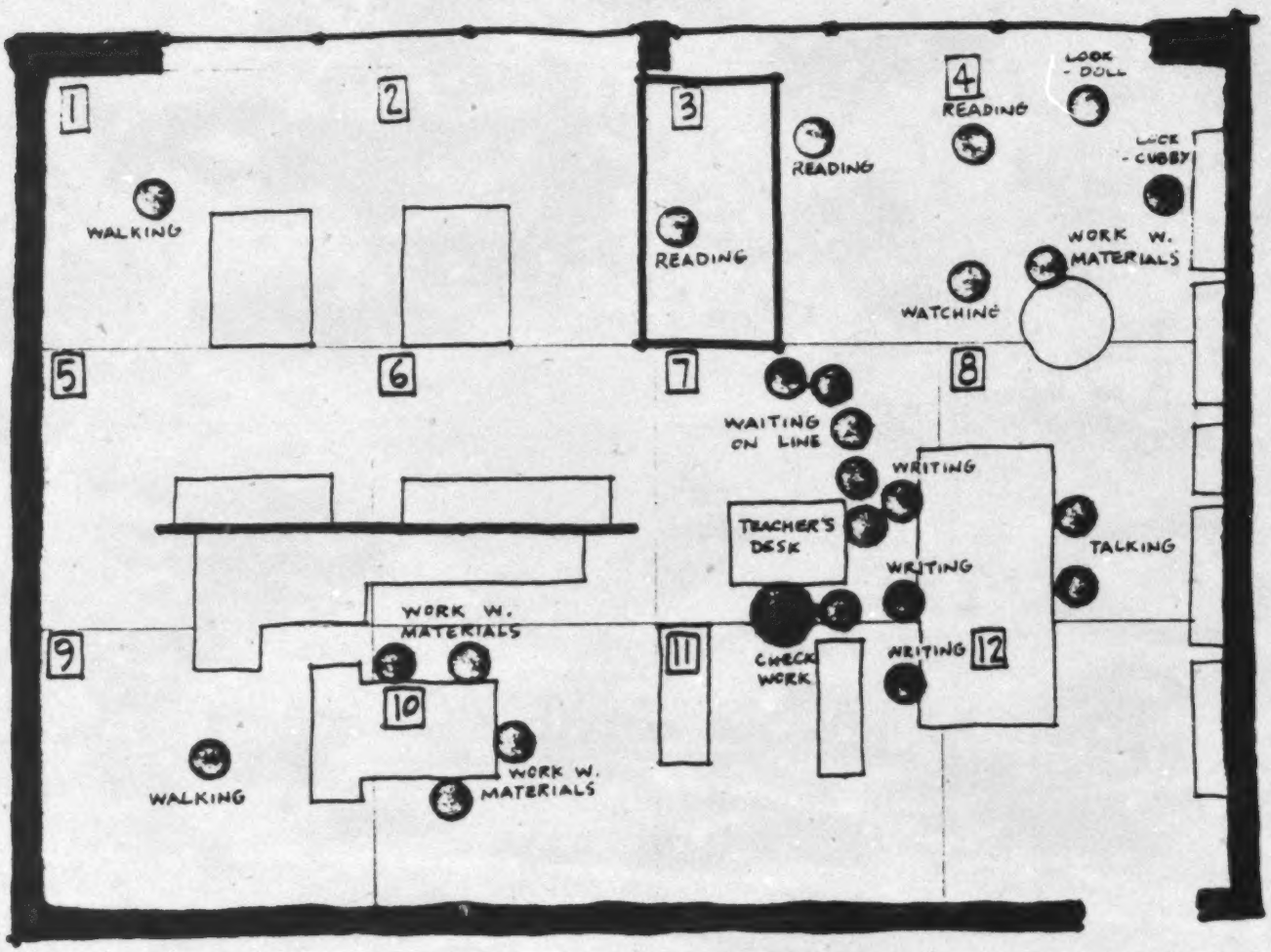

FIGURE II. ACTIVITY IN CLASSROOM B
10:30 A.M., MAY 23, 1974

TABLE I: RANKS AND PERCENTS OF ACTIVITIES OBSERVED IN SCHOOL B OVER THREE MAPPINGS

	Mapping I		Mapping II		Mapping III	
Ranks	Activity	%	Activity	%	Activity	%
1	Writing	26.1	Writing	20.7	Writing	22.7
2	Arts & Crafts	11.8	Talking	16.4	Talking	13.8
3	Talking	11.3	Working	13.4	Arts & Crafts	10.9
4	Reading	6.3	Reading	7.5	Reading	8.0
5	Working	5.7	Arts & Crafts	6.5	Traffic	
6	Teaching	5.1	Traffic	6.4	Working	6.0
7	Traffic	4.3	Watch act	4.5	Look at object	4.1

TABLE II: RANKS AND PERCENTS OF ACTIVITIES OBSERVED IN CLASSROOM B OVER THREE MAPPINGS

	Mapping I		Mapping II		Mapping III	
Ranks	Activity	%	Activity	%	Activity	%
1	Writing	22.7	Writing	21.3	Writing	24.4
2	Talking	13.1	Talking	15.4	Reading	15.4
3	Reading	11.2	Reading	14.7	Talking	12.3
4	Arts & Crafts	9.0	Arts & Crafts	10.2	Arts & Crafts	9.0
5	Watch act	5.9	Working	5.7	Traffic	7.1
6	Working	4.7	Watch act	4.5	Working	6.2
7	Traffic	4.1	Traffic	4.3	Look at object	4.5

TABLE III: PERCENT OF OCCUPANTS IN TWELVE ROOM SECTORS FOR EACH MAPPING FOR CLASSROOM B[1]

Mapping I

1 6.7	2 3.1	3 12.7	4 30.3
5 4.4	6 2.9	7 12.6	8 3.7
9 5.2	10 5.7	11 5.5	12 7.0

Mapping II

1 4.6	2 5.1	3 11.5	4 22.3
5 1.1	6 1.7	7 3.6	8 26.6
9 1.8	10 1.3	11 6.6	12 13.9

Mapping III

1 8.6	2 6.5	3 21.7	4 20.4
5 0.8	6 0.6	7 4.5	8 15.2
9 2.8	10 6.9	11 3.3	12 8.9

[1]Each sector represents one of 12 equal segments of the room

TABLE IV: SIZE OF GROUP BY PERCENT
OVER THREE MAPPINGS FOR CLASSROOM B

Size of Group	Mapping I %	Mapping II %	Mapping III %
1	67.2	69.4	73.6
2	18.4	19.9	16.5
3+	11.3	8.0	7.3
8+	1.1	0.4	0.4
15+	1.7	2.1	1.8
N	510	422	422

TABLE V: RANKS AND PERCENTS OF TEACHER ACTIVITIES OBSERVED IN CLASSROOM B OVER THREE MAPPINGS[1]

	Mapping I		Mapping II		Mapping III	
Ranks	Activity	%	Activity	%	Activity	%
1	Talking	20.0	Check work	38.2	Check work	44.8
2	Teaching	15.0	Teaching	29.4	Group meeting	13.8
3	Check work	12.5	Talking	11.8	Talking	13.8
4	Group meeting	10.0			Teaching	13.8
5	Watch act	7.5			Administrative	10.3
6	Administrative	7.5				

[1]All other activities represent 4% or less of total teacher time

TABLE VI: PERCENT OF TEACHER TIME SPENT IN TWELVE ROOM SECTORS FOR EACH MAPPING

Mapping I

1 2.6	2 10.3	3 20.5	4 12.8
5 5.1	6 12.8	7 12.8	8 2.6
9 2.6	10 10.3	11 5.1	12 2.6

Mapping II

1	2	3	4 12.5
5	6 12.5	7 12.5	8 37.5
9	10	11 9.4	12 15.6

Mapping III

1	2 3.6	3 10.7	4 14.3
5	6 3.6	7 32.1	8 14.3
9 3.6	10	11	12 17.9

TABLE VII: TEACHER ACTIVITY BY GROUP SIZE ACROSS THREE MAPPINGS

Size of Group	Mapping I %	Mapping II %	Mapping III %
1	25.0	5.9	20.7
2	40.0	55.9	37.9
3+	20.0	5.9	6.9
8+	0.0	5.9	6.9
15+	15.0	26.5	27.6
N	40	34	29